MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

WASHINGTON, D. C., APRIL, 1882.

WAR DEPARTMENT,

OFFICE OF THE CHIEF SIGNAL OFFICER,

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

This REVIEW presents a general summary of the meteorological data collected by the Signal Service during the month of April, 1882.

The weather has been particularly favorable for agricultural pursuits in almost every section of the country, and trustworthy reports indicate that the crops of cereals will be above the average, and in the southern sections of the country, where there is an unusually large acreage of wheat, an early and abundant crop is anticipated.

The April rains on the Pacific coast have placed the crop in that region out of danger, and in the southern sections of California, the pasturage is reported to be excellent.

In the northwestern states, and in sections of Tennessee and Kentucky, the peach, cherry and pear crops were injured by April frosts, while in the eastern sections of the country the fruit crop is well advanced and promises to compare favorably with the average yield.

The severe storms of the month passed over the central part of the United States from Colorado eastward, south of the average course of April storms, and were in almost every case attended by local storms and tornadoes which proved destructive to both life and property.

A new feature of THE WEATHER REVIEW will be found under the head of "Cotton-Region Reports." The Chief Signal Officer has recently begun a system of daily telegraphic reports for the benefit of those interested in this staple, and the accompanying table gives the monthly mean of the maximum and minimum temperatures and the average rainfall for the month in the various cotton districts throughout the south.

A general interpretation of the reports for the month will show that the weather has been favorable; the observer at Chattanooga reports that cotton-planting is proceeding rapidly and that the acreage is 40 per cent. greater than in 1881. It is estimated that 25,000 bales will be produced in Hamilton county, Tennessee.

That part of THE REVIEW referring to International Meteorology presents the general weather conditions which prevailed over the northern hemisphere during the month of February, 1880, and the tracks of barometric minima for May, 1880, traced from simultaneous observations taken at 7.35 a. m., Washington mean time. It will be seen that the cold weather which prevailed over Europe during January, 1880, continued until about the 10th of February, when the extended area of high barometer in that region disappeared, and was followed by a succession of storms over northern and northwestern Europe, attended by southerly winds and warmer weather.

The magnetic storm which occurred during the auroral display of the 16th is of special interest. Reports show that the display was visible westward from the British Isles to the Pacific coast, and that vessels on the Atlantic apparently changed their course both to the north and south of the true course when the display was most brilliant.

An unusual number of icebergs were encountered by vessels in the North Atlantic during the month, and at the close of April the danger to shipping approaching the coast, was very great. An examination of chart number vii., which exhibits the limits within which ice was observed, suggests the advisability of selecting the southern routes for vessels passing to and from Europe at this season of the year. Under the heading of "Ocean Ice," will be found special reports giving the latitude and longitude in which icebergs were observered.

In the prepartion of this REVIEW the following data have been used, viz: the regular tri-daily weather charts, containing the data of simultaneous observations taken at one hundred and thirty-five Signal Service stations and fifteen Canadian stations, as telegraphed to this office; one hundred and ninety monthly journals and one hundred and seventy-three monthly means from the former, and fifteen monthly means from the latter; one hundred and ninety-five monthly registers from voluntary observers; sixty monthly registers from United States Army Post Surgeons; Marine Records; International Simultaneous Observations; Marine Reports through the co-operation of the New York Herald Weather Service; abstracts of Ships' Logs, furnished by the publishers of "The New York Maritime Register"; monthly reports from the local weather services of Kansas, Nebraska and Missouri, and of the Central Pacific railway company; trustworthy newspaper extracts; special reports.

BAROMETRIC PRESSURE.

The mean barometric pressure for the month over the United States and Canada is shown by the isobarometric lines, in black on chart ii. The area of lowest mean pressure extends from southern Arizona, northeastward over northern New Mexico and the greater part of Colorado. While a second area of low pressure is central in the north Atlantic and extends to the westward over the Gulf of Saint Lawrence. The barometer is highest north of Lake Superior and Minnesota. From the chart it will be seen that the area of mean high barometer extends over the central part of the continent. Compared with the previous month, the pressure is from five-

hundredths to one-tenth of an inch lower at stations on the Atlantic and Gulf coasts. In the Rocky mountain regions, the pressure is from fifteen to twenty-five hundredths lower. The area of low barometer now extends over the regions covered by the area of greatest pressure for March. On the Pacific coast, the pressure has remained about stationary at San Francisco and has fallen at stations north and south, the greatest change being in the north of Oregon. Compared with April, 1881, the mean pressure is from one-tenth to twenty-five hundredths of an inch greater in the northeastern part of the United States, one-tenth of an inch greater in the lake region, and slightly less at stations in the southern part of the United States.

DEPARTURES FROM THE NORMAL VALUES FOR THE MONTH.

Compared with the means of previous years, the pressure is slightly above the normal along the Atlantic coast, and from five-hundredths to one-tenth of an inch above in the lake region and Minnesota. It is slightly above the normal on the Pacific coast, and slightly below at stations in Colorado, New Mexico and Utah.

BAROMETRIC RANGES.

The range of pressure during the present month has varied from two-tenths of an inch to one and four-tenths inches. The least range being at Campo, California, and the greatest range at Eastport, Maine; generally the range increases with the latitude and from the Mississippi valley eastward to the Atlantic coast. In the several districts the barometric ranges have been as follows:

New England: 1.40 inches at Eastport; 1.23 inches at New Haven, and 0.97 of an inch on the summit of Mount Washington.

Middle Atlantic States: 1.16 inches at New York; 0.92 of an inch at Lynchburg.

South Atlantic States: 1 inch at Cape Henry; 0.65 of an inch at Jacksonville.

Florida: 0.36 of an inch at Key West, and 0.55 of an inch at Cedar Keys.

East Gulf States: 0.69 of an inch at Montgomery, and 0.54 of an inch at Port Eads.

West Gulf States: 0.80 of an inch at Fort Gibson, and 0.62 of an inch at Brownsville.

Ohio Valley and Tennessee: 0.94 of an inch at Columbus; 0.67 of an inch at Knoxville.

Lower Lake Region: 1.22 inches at Oswego; 1.03 inches at Cleveland.

Upper Lake Region: 1.24 inches at Alpena; 0.85 of an inch at Duluth.

Upper Mississippi Valley: 1.04 inches at La Crosse; 0.84 of an inch at St Paul.

Missouri Valley: 0.96 of an inch at Omaha; 0.82 of inch at Springfield, Mo.

Extreme Northwest: 0.92 of an inch at Fort Buford; 0.77 of an inch at Moorhead.

Northern Slope: 1.12 inches at Fort Shaw; 1.01 inches at Fort Keogh.

Middle Slope: 0.95 of an inch at Dodge City; 0.64 of an inch at Pike's Peak.

Southern Slope: 0.70 of an inch at Concho; 0.62 of an inch at Stockton.

Northern Plateau: 0.89 of an inch at Spokane Falls, and 0.75 of an inch at Boise City.

Middle Plateau: 0.69 of an inch at Salt Lake City; 0.50 of an inch at Winnemucca.

Southern Plateau: 0.45 of an inch at Prescott; 0.35 of an inch at Florence.

North Pacific Coast: 1.16 inches at Portland; 0.89 of an inch at Olympia.

Middle Pacific Coast: 0.56 of an ich at Red Bluff; 0.45 of an inch at Sacramento.

South Pacific Coast: 0.46 of an inch at Yuma; 0.20 of an inch at Campo.

AREAS OF HIGH BAROMETER.

Six areas of high barometer have passed over the region of Signal Service stations during the month, four of which approached from the central part of British America and passed to the southeast over New England to the Atlantic, and two extended over the region west of the Mississippi, moving slowly to the eastward over the states south of the Ohio river.

In addition to the areas of high barometer traced to the eastward, an extended period of high pressure occurred in central British America and northern United States from the tenth to the fourteenth of the month.

I. The morning telegraphic report of the second indicated a rapid increase of pressure at Fort Garry and in the region of Lake Superior, immediately to the west of the storm which was then central in the upper Saint Lawrence valley. Northerly winds and light snows were reported from stations on Lake Superior, where the temperature had fallen 23° in the last sixteen hours. At the afternoon report of the second this area was central north of Lake Superior, apparently moving to the eastward. On the morning of the third the barometer had risen to 30.53 at Quebec, a rise of four-tenths of an inch in twenty-four hours, accompanied by northerly winds and temperature 15° above zero. The pressure increased at the centre of this area, as it moved to the eastward, from 30.20 to 30.50. During the fourth the pressure increased at the stations on the Atlantic coast where the wind directions indicated that the course of this area became more southerly after leaving the coast line.

II. This appeared first in the region north of the upper Missouri valley, following storm traced as low area ii. At this report there was a rapid gradient in the northwest quadrant of the depression, which was central near Marquette, where the barometer read 29.71. At Fort Garry the barometer read 30.41, with northerly winds and temperature 4° above zero. This area passed to the eastward, north of the Signal Service stations near the fiftieth parallel of north latitude, until the centre reached longitude seventy-two west, when the course changed to the southeast over northern New England to the Atlantic. As in the preceding area, the pressure increased at the centre until it reached the coast; but after passing the coast-line, the movement was more to the east, and at the stations on the south Atlantic coast the pressure changed but slightly. The winds shifted to the northeast on the New England and Middle Atlantic coasts, and the barometer was highest in the Saint Lawrence valley, and light rains occurred at the coast stations, accompanied by winds ranging in velocities from twenty-six to forty miles per hour between Capes Cod and Hatteras.

III. This appeared in British America north of Dakota, at midnight of the sixth, when low area iii. was central in Colorado. During the seventh it moved directly to the east and was north of Lake Superior at midnight of that date, the low area referred to above remaining almost stationary.

On the morning of the eighth it extended north of the lake region and the upper Saint Lawrence valley, the barometer at the centre reaching 30.40. The succeeding reports show the gradual disappearance of this area, or a westerly movement, attended by the rapid advance of the depression iii. from Colorado. The barometer continued high at the northern stations, and by morning of the ninth the area of greatest pressure extended over Manitoba. The barometer continued high in this region, ranging from 30.30 to 30.50, causing northerly winds and low temperatures in the northern districts of the United States, with occasional snows in the lake region and Canada.

On the twelfth, light snows occurred in New York and New England. Stations in these districts were under the influence of an extended area of low barometer which passed from the Atlantic northward east of the New England coast. During the thirteenth and fourteenth the pressure remained above 30.40 in the region between the Mississippi and the Missouri rivers, without a decided change in the pressure at stations south and east of this region until the fifteenth.

IV., resulted from an easterly movement of the permanent area of high pressure which extended over the centre of the continent from the eleventh to the fourteenth. On the afternoon of the fourteenth the pressure was greatest in Manitoba and sixteen hours later it was greatest in central Texas. The isobar of 30.20 inclosing the regions of Lake Superior, southwestward over Iowa, Missouri, Arkansas, Kansas, and Indian Territory. The advance of a low area from the upper Missouri valley attended a southeasterly movement of this area. The barometer remained highest near Cairo until midnight of the sixteenth, the pressure being above the normal from the northern lakes southward to the Gulf coast. On the seventeenth, the pressure diminished rapidly west of the Mississippi, as this area disappeared off the south Atlantic coast.

V. The midnight report of the twentieth indicated the approach of this area from the region north of Lake Superior, while storm viii. was central in western Kansas. The barometer rose in the districts north of the Ohio river as the storm above referred to, moved to the eastward, causing an increase of the barometric gradients in the northeastern quadrants of the depression. These conditions continued until the night of the twenty-second, when the high area was central north of Lake Huron and storm viii. was central in the Ohio valley. The barometer continued high in the lake regions during the twenty-third, and it rose at stations to the westward, attended by northerly winds and fair weather in the districts north of Virginia and Tennessee. These conditions continued until the morning of the twenty-sixth, when the high area had advanced to the Canadian maritime provinces, the movement to the east being apparently increased by the advance of a storm which was then in the Mississippi valley. The barometer continued near 30.30 in this area, as it moved off the northeast coast, being about the same pressure that was observed on the twentieth, when it appeared in the northwest.

VI. On the twenty-seventh, the pressure was about 30.30 on the coast stations of Oregon and Washington territory, and cold northerly winds with light snow were reported at the northern Rocky mountain stations. The midnight report of the twenty-seventh showed an increase of pressure to the eastward, the barometer ranging about 30.40 in the upper Missouri valley. By midnight of the twenty-eighth the barometer was rising as far eastward as the lake region, and southward to Arkansas, the barometer reaching the maximum, 30.63, at Fort Custer at this report. The pressure decreased slowly at the centre as this area extended over the central part of the United States on the twenty-ninth. A light norther occurred on the Texas coast between three and eleven p. m. on the twenty-ninth, with but a slight change in temperature. The centre passed slowly over the Missouri valley on the thirtieth and at the close of the month was near Memphis, the isobar of 30.20 inclosing the states of the lower Mississippi valley and a part of Texas.

AREAS OF LOW BAROMETER.

Eleven areas of low barometer have appeared within the limits of, or approached the stations of observations during the month, which were sufficiently well-defined to render it possible to approximately determine the positions of the centres at consecutive telegraphic reports. The tracks of the centres of these depressions are exhibited as usual on chart i. Compared with April of previous years, the barometric disturbances have been more numerous than in April of 1881, and less frequent than in April of 1879–80:

The following table shows the number of areas of low barometer occurring during the month of April since 1873, as traced on chart i. of THE MONTHLY WEATHER REVIEW:

Month.	Year.	No.	Month.	Year.	No.
April,	1873,	8.	April.	1878,	9.
"	1874,	13.	"	1879,	18.
"	1875,	10.	"	1880,	14.
"	1876,	13.	"	1881,	7.
"	1877,	9.	"	1882,	11.

It will be seen from the above that the number of low areas occurring during the current month is the average number occurring for April, as determined from the past ten years of observations.

The following table gives the latitude in which each area was first and last observed, and the average hourly velocity:

Areas of low barometer.	First Observed.		Last Observed.		Average h'orly velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
No. I.	49° 5′	101°	47°	68°	28.5
II.	49°	111°	52°	63°	48
III.	35° 5′	107°	42° 5′	68°	39
IV.	42°	112°	32° 5′	77°	19.5
V.	42°	67°	50°	64°	19
VI.	45°	124°	27° 5′	84° 5′	25.5
VII.	49°	109° 5′	44°	66°	29.5
VIII.	48°	108°	34°	76° 5′	17
IX.	41°	107°	38°	74°	31
X.	40°	69°	43°	63° 5′	21
XI.	48°	92°	46° 5′	87°	47

Generally the storm tracks of the current month, are to the south of those of the preceding month, and the storms which developed the greatest energy are traced from the central Rocky mountain region, almost directly eastward over the central part of the United States. Only one disturbuance was traced from the Pacific coast eastward, and this disappeared southward to the Gulf coast.

I.—The morning weather chart of the first exhibited an area of high pressure off the New England coast, where the barometer was 30.50. The barometric pressure of 29.80 was central over Manitoba, attended by east to south winds and fair weather in all districts east of the Rocky mountains. During the first, this depression moved rapidly to the eastward, and on the morning of the second, it had reached the upper Saint Lawrence valley, enclosed by an isobar of 29.70. It passed over northern New England on the second, causing snow at the northern stations and dangerous northeast to northwest winds off the middle Atlantic and New England coasts, and high winds extending to the northeast as far as Sidney. Signals were displayed at the lake stations at the close of the month and were ordered at stations on the Atlantic coast between Hatteras and Newport, on the morning of the second.

The following maximum velocities were reported:

Hatteras, 36 miles, s. w.; Delaware Breakwater, 36, s. w.; Shoreham, 32, s. w.; Boston, 32, n. w.; Portland, 26, n.

II.—This probably developed in the north Pacific and passed over the north Pacific coast to Montana where it was central on the afternoon of the second, but not clearly defined. On the morning of the third it was central in Manitoba, where the barometer was 29.64—a fall of 0.54 of an inch in twenty-four hours. This storm developed energy during the day as its course changed from east to south of east, the centre of disturbance passing over Lake Superior. After reaching the upper Saint Lawrence valley, the course changed to the northeast, and the depression disappeared, followed by south to west gales at Father Point, and at stations on the New England coast. The pressure diminished at the centre of this area as it moved eastward and when last observed the barometer had fallen to 29.37 at Anticosti on the afternoon of the third. Following this storm, the temperature fell below freezing at stations in the northern portions of the United States, east of the Missouri valley. Signals were displayed in advance of this storm at stations on the lakes and at the Atlantic coast stations north of Kittyhawk.

They were generally justified by the following maximum velocities of wind occurring during the display:

Duluth, 29 miles, n. w.; Escanaba, 41, n.; Milwaukee, 44, s. w.; Grand Haven, 36, s.; Rochester, 39, w.; Delaware Breakwater, 37, n. e.; Cape Henry, 40, n. e.; Boston, 32, s. w.; Eastport, 28, s. w.

The wind reached a velocity of fifty miles from the south at Father Point, when the centre of the storm was near Rock-

liffe, and a velocity of forty-five miles from the north after the centre had passed to the east of that station.

The following reports furnished through the co-operation of "The New York Herald Weather Service," probably indicated the presence of this storm during its passage eastward over the ocean:

On the fifth, s. s. "British Crown," latitude 43° 14′ N., longitude 43° 16′ W., strong gale to moderate breeze, cloudy, heavy head-sea, wind north-northwest. On the sixth, latitude 40° 26′ N., longitude 47° 26′ W., moderate breeze to moderate gale, clear, winds easterly to northerly. On the sixth, s. s. "Britannic," latitude 45° 41′ N., longitude 38° 25′ W., barometer 29.65, wind s. w., force, seven.

III.—This storm developed slowly in the Rocky mountain regions south of Utah during the third and fourth, but the reports of the second and third indicate that the pressure was below the mean in the northern portions of Mexico on those dates. At midnight of the fourth the barometer was below 29.90 from El Paso northward to British America, and it was above 30.10 in the Mississippi valley and on the Pacific coast. The direction of the wind reported at stations in the mountain districts, indicated a general circulation of the wind about the centre of low pressure, accompanied by occasional light rains. The morning weather map of the fifth exhibited a well-defined depression of 29.80 central near Cheyenne, but the afternoon of the same date indicated that the disturbance had lost energy and extended to the northward. On the morning of the sixth this storm was central in northern Iowa, apparently advancing towards the area of high barometer which then extended over the Saint Lawrence valley and New England. The gradient increased rapidly in front of this storm, and when it was central near Saint Paul, the barometer was one inch lower than the barometer at Montreal at the some report. The course continued northeasterly during the sixth until the centre reached its most northern latitude, near Lake Superior, when the course changed to the east. In passing over Wisconsin during the sixth the wind reached its maximum velocity from the south and southwest on Lake Michigan. On the afternoon of the seventh the course changed to southeasterly, the storm passing over New England and disappearing to the east of Nova Scotia. The pressure increased slowly at the centre of this depression as it approached the Atlantic coast. The signals ordered as warnings for the preceding storm, were continued at the lake stations in advance of this storm. When the disturbance passed over Iowa and Wisconsin, several destructive tornadoes occurred in its southeast quadrant. In Michigan twenty miles east of East Saginaw, a tornado passed to the east, tearing down houses, trees, and fences; the track being about forty rods in width. Near Hempstead in the same state, on the "Holly and Pere Marquette Railway," a tornado passed over Kalamo township, Eaton county, Michigan, destroying houses and barns, and killing a large amount of stock. This is probably the same tornado, that passed over Highlands the same night. Reports from Kalamazoo, state that a tornado passed over the western part of that county, and then over Barry and Eaton counties, all houses, barns, and fences, being destroyed in its path, which was from twenty to forty rods in width. Destructive winds and heavy rains also occurred in the vicinity of Keokuk, Iowa.

The following reports furnished through the co-operation of The "New York Herald" Weather Service, probably indicate the presence of this storm during its passage over the ocean:

On the eight s. s. "British Crown," in lat. 39° 50′ N., long. 59° 28′ W., fresh breeze to strong gale, cloudy with rain, wind north-northwest to southeast. On the ninth, lat. 39° 12′ N., long. 65° 34′ W., strong gale to moderate breeze, northerly winds. On the eight, s. s. "Arizona," lat. 44° 26′ long. 44° 13′ wind north-northwest, force 7. On the tenth, s. s. "Italy," lat. 48° 50′ N., long. 31° 56′ W., w.s.w. gale.

IV.—This storm developed in the Rocky mountain region when the preceding one was in the lake region. During the sixth, northerly winds and snow prevailed in Idaho, Montana, Utah, and Nevada, where the barometer ranged from 30.60 to 30.80. On the morning of the seventh this storm was central in Colorado, and it moved slowly eastward during the day, followed by northerly winds and snow in Wyoming and Colorado, and was preceded by southerly winds and local rains in the Mississippi and Missouri valleys and thence southeastward over the Gulf States. The course was to the northeast during the eighth, the centre being enclosed by the isobar of 29.60. It reached the most northerly point of its course on the morning of the ninth—lat. 44°, long. 96° W. This storm followed the general course of iii. until it reached the Missouri valley, and was attended by destructive tornadoes in its southern and eastern quadrants. When the centre of disturbance was in eastern Colorado, a tornado occurred in Rice county, Kansas, passing in a northerly course over the town of Chase, destroying the greater part of the town. On the same date a tornado occurred at Fort Riley, Kansas, unroofing stables and causing much damage to the officers' quarters. Tornadoes occurred on the same dates in several of the nortwestern states, as this depression passed that section of the country. The area of high barometer which extended over the region north of the lakes on the ninth, apparently caused this depression to change its course to the southeast, after which the lowest isobar enclosed a trough of low pressure extending from the lower Ohio valley to the coast. Dangerous northeast winds occurred at the lake stations during the night of the ninth, and freezing weather with light snows prevailed at stations north of the Ohio river. Northeasterly gales and light snow also occurred on the New England coast as this storm passed to the southeastward, south of Cape Hatteras on the tenth.

Signals were displayed at the stations on the upper lakes on the morning of the eighth, on the lower lakes at the afternoon report of the ninth, and at stations on the Atlantic coast between Jacksonville and Cape Cod on the morning of the tenth.

The following maximum velocities indicate the energy with which this storm passed over the lake region and Atlantic coast: Hatteras, 56 miles, n.e.; Kittyhawk, 51, n.; Cape May, 36; New Shoreham, 36, n.e.; Duluth, 38, n.e.; Milwaukee, 34, n.

V.—This depression was at no time within the limits of the stations of observation but appeared south of Nova Scotia, moving from the South Atlantic, and was central south of Yarmouth on the morning of the eleventh, when heavy snows were reported from Eastport, Halifax and Yarmouth. This disturbance moved northward over the maritime provinces on the eleventh and twelfth, inclining first to the northeast and then to the northwest, until the center of disturbance was near Father Point, where the barometer fell to 29.21. The gradient increased to the southeast from the thirteenth, when the depression was apparently forced to the northeast by the high area which extended over the northern districts of the United States.

The following reports furnished through the co-operation of "The New York Herald" weather service, probably indicates the presence of this storm during its passage over the ocean:

S. S. "Rhynland," on the seventeenth, lat. 43° 44′ N., long. 42° 5′ W; barometer, 29.79, wind-force 10, south by west; very heavy gale and sea; gale began with wind in southeast, blew hardest from south by west, hauled slowly around to northwest and died out—sea following the wind; s. s. "Celtic," on the eighteenth, in lat. 42° 20′ N., long. 49° 20′ W., strong gale, n.n.w. winds. S. S. "Catalonia," on the eighteenth, lat. 50° N., long. 20° W., strong gale, westerly winds; s. s. "Wyoming," on the eighteenth, lat. 50° 16′ N., long. 22° 21′ W., moderate to strong gale, frequent rain showers with head sea, wind northwest to southwest.

VI.—This storm passed east from the Pacific ocean on the morning of the ninth, as a slight depression, and during the ninth and tenth moved to the southeastward over the Rocky mountains to western Texas. After reaching southern Texas, the course changed to the east, the storm passing over the Gulf of Mexico on the twelfth. A severe norther occurred at

Galveston and Indianola, the wind reaching a maximum velocity of forty-four and forty-seven miles, and the temperature falling thirty degrees. Heavy local rains occurred in the Gulf states as the centre moved to the east, south of the Gulf coast, and apparently disappeared near the west coast of Florida. The norther continued in the west Gulf states until the fifteenth, and floods occurred in the Gulf states. At New Iberia, Louisiana, on the twelfth, high northwest winds occurred, destroying houses and crops. The following report has been received from that locality: There was a general destruction by a violent storm which came from the northwest on the night of the twelfth. * * * Houses were torn to pieces, and fences, provisions, forage, furniture and everything previously saved from the floods were destroyed. In Iberia parish, Louisiana, at least fifteen hundred persons were left homeless and without means of support and shelter.

The situation is appalling. The height of the flood above tide-water was nearly seventeen feet. The east side of the Teche, from Loranville to Pattersonville, one hundred miles in a straight line north and south, is a lake extending from west to east to the high ridges of Bayou Lafouche, fifty-miles wide."

Another report says: "The wind which on Wednesday, all day and night, blew strongly from the southeast along the coast of Louisiana, drove the waves from the gulf into Berwick's bay and the vast expanse of water covered the country for fifty miles east and west, from the ridge of Lafouche to the hills west of the Teche and for a hundred miles north and south. The water was thus piled up at Morgan City 4.6 inches above the flood of 1874, and very considerably above the highest flood-level ever attained before by the waters of the Atchafalaya. Houses were wrecked and damaged, and places never before inundated in the knowledge of the oldest inhabitant, were now covered with water."

VII.—This was central in Utah on the sixteenth, passing southward to the northern part of New Mexico, and northeastward over Colorado and Nebraska, with increasing energy, causing heavy rains, or snows in the Missouri valley and high southerly winds in Texas, Arkansas, Missouri, and Kansas. At four o'clock in the afternoon of the eighteenth, when the depression was central near Yankton, one of the most destructive tornadoes occurred at Brownsville, Missouri. An observer reports as follows: "A few moments before four o'clock a light wind began blowing, accompanied by light rain. Almost immediately the atmosphere became heavy and close. Two large blueish colored clouds appeared; one in the south and the other in the southwest; these clouds were apparently several miles distant, and seemed to be approaching each other with great velocity, when within about two miles of the town the two clouds united and, immediately after, a loud roaring noise was heard similar to the distant rumble of a locomotive. The noise increased as the storm approached the town. Before the clouds united each moved over an irregular and reeling course, but after they united, the cloud assumed the shape of a large funnel, the mouth hanging close to the ground. The storm-cloud moved forward in a zigzag motion with great velocity, and scarcely five minutes elapsed from the time the first cloud was seen until the town was destroyed"

Less destructive tornadoes occurred on the same date in Illinois and Iowa. After reaching northwestern Iowa, this depression inclined slightly to the southeast, and then moved to northeast over Michigan, Saint Lawrence valley, and New England, and then disappeared to the eastward of Nova Scotia on the twenty-first.

The following reports furnished through the co-operation of "The New York Herald Weather Service", probably indicate the presence of this storm over the ocean:

On the twenty-second, s. s. "Catalonia", lat. 46° 22′ N., long. 40° 11′ W., moderate gale, hazy. On same date, s. s. "Wyoming" lat. 45° 15′ N., long. 41° 46′ W., moderate gale and hail squalls. On the twenty-third, lat. 43° 43′ N., long. 46° 32′ W., fresh gale with head sea; on the twenty-second, s. s. "Nevada", lat. 41° 36′ N., long., 62° 30′ W., moderate gale; on the twenty-fifth s. s. "Britannic", lat. 40° 08′ N., long. 37° 84′ W., strong westerly wind and high head sea.

This storm developed its greatest energy while passing over the lake region, the wind reaching a maximum velocity of 44 miles, s.w., at Sandusky; 44, n.w., at Grand Haven; 41, w., at Rochester; and 42, s.w., at Buffalo. There was a destructive tornado at Pennsville, Pa., occurring about four o'clock in the afternoon on Wednesday, the nineteenth.

VIII.—This depression developed in the upper Missouri valley on the night of the nineteenth and moved southward to western Kansas, where it was central at midnight of the following day. It moved slowly to the eastward during the twenty-first and twenty-second causing heavy rains in all districts south of the lake region, and dangerous northeast gales at stations on the lakes. When central near Cairo, severe local storms occurred in the Gulf states. This depression passed to the eastward over Kentucky and North Carolina on the twentythird, and disappeared to the southeastward off the south Atlantic coast, attended by strong northeasterly gales at stations north of Charleston. On Saturday, the twenty-second, a violent tornado occurred in Pender and Brunswick counties, North Carolina. The storm moved in a northerly direction across the Cape Fear river, making a perfect lane through the woods and fields, the tract being about two hundred yards in width.

Tornadoes also occurred in Bibb county, Georgia, and Dallas county, Alabama, on the afternoon of the same date.

IX.—This storm was first observed in Colorado at midnight of the twenty-fourth, and moved directly eastward during the twenty-fifth and twenty-sixth, passing over the central part of the United States, and leaving the middle Atlantic coast on the twenty-seventh. When the course changed to the northeast, this storm followed the general direction of the coast line, developing considerable energy, and disappearing to the eastward of Nova Scotia on the twenty-eighth. On the twenty-eighth, s. s. "Britannic," lat. 41° 55′ N., long. 60° 7′ W., barometer 29.86, wind south, force seven.

X.—This was a slight depression which appeared off the New England coast on the thirtieth, apparently moving to the northeast, but the centre was at no time within the limits of the Signal Service stations.

XI.—Advanced from British America on the last day of the month and was central over lake Superior at the close of the month, as a slight barometric disturbance.

INTERNATIONAL METEOROLOGY.

International charts iv. and v. accompany the present number of this REVIEW. Chart iv. is published for February, 1880, and continues the series of that chart begun in January, 1877. Chart v. is prepared for May, 1880, and continues the series of that chart from November, 1877. In the preparation of these charts, which are based upon the daily charts accompanying the INTERNATIONAL BULLETIN of the Months of February and May, 1880, much valuable information has been obtained from the "Monatliche Uebersicht der Witterung" for February and May, published under the direction of Prof. Dr. G. Neumayer, director of the German Marine Observatory, and from the "Bulletin Mensuel," published by Mr. Marc Dechrevens, of Zi-Ka-Wei, China. Chart iv. exhibits the mean pressure, the mean temperature and the prevailing direction of the wind over the northern hemisphere for the month of February, 1880, as determined from one observation every day taken at 7.35 a. m., or 0.43 p. m., Greenwich mean time.

The most marked area of low barometer extends over the north Atlantic ocean between the British Isles and Greenland, and is central near Stykkisholm, where the mean pressure for the month was 29.28, and the prevailing wind was southwest, force 5.

The barometric gradient increases rapidly to the southeast and west, and very slowly in a northeasterly direction, indicating an extension of low area over the Artic regions.

The second area of mean low barometer is central over British India, where, in the southern part of Hindôstan, the mean pressure for the month was below 29.90.